

PRESERVING AKSARA JAWA THROUGH 3D GAME



**This Final Project Compiled a Condition to Complete Bachelor Degree Program at
Departement of Informatics Faculty of Communication and Informatics**

Submitted by:

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FACULTY OF COMMUNICATION AND INFORMATICS
UNIVERSITAS MUHAMMADIYAH SURAKARTA**

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APROVAL PAGE


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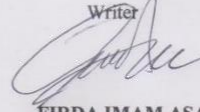
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PRESERVING AKSARA JAWA THROUGH 3D GAME

Abstrak

Aksara jawa sudah semakin terabaikan dari generasi ke generasi berikutnya karena jarang digunakan dalam kehidupan sehari-hari yang menyebabkan terlupakan dan terabaikan, sehingga diperlukan media yang dekat dengan generasi tersebut untuk menjaga kelestariannya. Media yang cukup dekat dengan generasi sekarang salah satunya adalah *game*. *Game* sangat diminati dan tidak membosankan membuat pemain tanpa sadar dapat mengingat, dan mengetahui setiap konten didalamnya, alangkah baiknya jika konten didalamnya mengandung ilmu pengetahuan dan kebudayaan yang perlu dilestarikan. Penelitian ini bertujuan untuk mengembangkan *game* 3D untuk melestarikan aksara jawa. *Game* ini ditujukan untuk platform Windows pada PC/Laptop. Metode yang digunakan yaitu *Game Development Life Cycle* (GDLC) karena memiliki tahap yang spesifik dalam pengembangan *game*. Dalam pengujian blackbox *game* sudah memiliki kesesuaian antara input dan output. *Game* juga telah diuji terhadap pengguna, dimana 88% dari mereka mulai mengenal dan mengingat kembali aksara jawa, dengan begitu *game* dapat dijadikan sebagai media untuk melestarikan aksara jawa.

Kata Kunci: Aksara jawa, *game* 3D, windows, GDLC.

Abstract

Aksara jawa has been increasingly ignored from generation to the next generation because it is not used in everyday life which causes it to be forgotten and neglected, so that the media that can

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Aksara jawa sudah semakin terabaikan dari generasi ke generasi berikutnya karena jarang digunakan dalam kehidupan sehari-hari yang menyebabkan terlupakan dan terabaikan, sehingga diperlukan media yang dekat dengan generasi tersebut untuk menjaga kelestariannya. Media yang cukup dekat dengan generasi sekarang salah satunya adalah *game*. *Game* sangat diminati dan tidak membosankan membuat pemain tanpa sadar dapat mengingat, dan mengetahui setiap konten didalamnya, alangkah baiknya jika konten didalamnya mengandung ilmu pengetahuan dan kebudayaan yang perlu dilestarikan. Penelitian ini bertujuan untuk mengembangkan *game 3D* untuk melestarikan aksara jawa. *Game* ini ditujukan untuk platform Windows pada PC/Laptop. Metode yang digunakan yaitu *Game Development Life Cycle* (GDLC) karena memiliki tahap yang spesifik dalam pengembangan *game*. Dalam pengujian blackbox *game* sudah memiliki kesesuaian antara input dan output. *Game* juga telah diuji terhadap pengguna, dimana 88% dari mereka mulai mengenal dan mengingat kembali aksara jawa, dengan begitu *game* dapat dijadikan sebagai media untuk melestarikan aksara jawa.

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Abstract

Aksara jawa has been increasingly ignored from generation to the next generation because it is rarely used in everyday life which causes it to be forgotten and neglected, so that the media that are close to the generation are needed to preserve it. The media that is close enough to the current generation one of which is the game. Games are very popular and are not boring, making players able to remember and know every content in the game, it would be nice if the content in the game contains knowledge and culture that need to be preserved. This research aims to develop 3D games to preserve Aksara jawa.. This game is intended for Windows platforms on PC / Laptop. The method used is the Game Development Life Cycle (GDLC) because it has a specific stage in game development. In testing the game blackbox already has a match between input and output. The game has also been tested on users, where 88% users are starting to recognize and recall Aksara Jawa, so that games can be used as a medium to preserve Aksara Jawa.

Keywords: Aksara jawa, 3D game, windows, GDLC.

1. INTRODUCTION

Aksara jawa is a Javanese letters in Javanese culture that has an important meaning in the development of life in Java. The ancestors of the Javanese community wrote with *aksara jawa*, it was proven by the many Javanese literature manuscripts in national and even national libraries and museums, for example, the Leiden University Library in the Netherlands which holds a large collection of Javanese literature manuscripts. However, now *aksara jawa* is rarely used, unlike the past, many of today's generation have forgotten that they did not even know the *aksara jawa*. *Aksara jawa* is indeed taught in schools but after graduating from school people start rarely using *aksara jawa*, then abandoned and will gradually forget, which will have the potential for the existence of the Javanese culture literature (Prabowo, 2016). According to Agus Dono (2015), local wisdom is considered irrelevant to the future, consequently, it has affected the decay of cultural heritage because it has been neglected, even neglected.

Therefore *aksara jawa* must be preserved, for that there must be media that are of interest and be able to attract attention in the preservation of *aksara jawa*, one of which is game. Currently, the game has developed very rapidly and is loved by many levels of society from children to adults. Games can easily attract someone to play games almost every day for hours, there are many reasons why games can be easily liked, including fun gameplay and interesting story plots, making players feel at home for long playing games and unnoticed players can remember the content that is in the game (Dwiyono, 2017). Aroutis N Foster (2014) in a study, conclude that the game can be able to establish the identity personal, making science activities very meaningful and relevant, and demonstrate the application of scientific activities outside of learning activities at school and for personal agendas presenting situations for engagement, curiosity, and understanding.

Games will be very useful if they include content that contains culture so that it can become a medium for cultural preservation. Wijaya et al. (2012) in their writing entitled *Game Kebudayaan Sebagai Salah Satu Bentuk Pelestarian Kebudayaan dan Media Pembelajaran* concluded that games can be used as entertainment while preserving Indonesia's cultural heritage. Khairani et al. (2014) in a published article titled *Pemanfaatan Produk Budaya Modern dalam Bentuk Game untuk Mobile Gadgets as Media for the Preservation of Traditional Culture* concludes that games are a medium that can bring youths together as the successor to the nation and culture that must be preserved.

The current generation will be more interest in knowing their culture by playing games. Probert (2013) states research has shown that games can have a positive impact on curiosity by providing a potentially motivating and attractive environment. Watson, Mong, and Harris (2011) in a study entitled "A case study of the in-class use of a video game for teaching high school history" states interactive multimedia can increase enthusiasm and make the learning process more interesting, attractive and make life history.

Based on a series of presentations from previous studies, it is necessary to have a media that is close to the current generation to reintroduce a culture that has begun to be ignored to remain sustainable. There are only a few games that promote javanese culture such as *aksara jawa*, so it is very necessary to keep up with games that promote external culture, so that people will get to know their own culture more than the other way around. The purpose of this research is to design and build a 3D game that can be a medium for preservation of *aksara jawa* to stay awake and be able to synergize with current technological advancements so that the use of *aksara jawa* becomes more extensive and relevant to the current generation who like to play games like children to adults.

2. METHOD

2.1 Game Development Method

This research uses the Game Development Life Cycle (GDLC) method based on the research of Mustofa et al. (2019) where the method has seven stages, namely:

2.1.1 Idea

This stage is the foundation of what kind of game will be made to produce the overall game concept. To determine the concept of game concepts in this study, the researchers conducted a review of several *aksara jawa* games that already existed and also several games with different genres to produce a unique game and have differences with other games. The idea is to develop a game with the following description:

Table 1. Game Description

Category	Description
Title	Bakul Gethuk
Platform	Windows
Type	3D
Genre	Open World, Simulasi

2.1.2 Analysis

Analysis is a stage to gather the needs in designing and building games, such as determining the hardware and software that will be used. To make the game in this study researchers used a computer with hardware specifications are Intel Core i5-6200U, 4GB of memory and 2GB of VRAM. The software used is Unity, which is a cross-platform game engine with many features offered, having Mono Develop as a text editor used for coding games. Researchers also use Mixamo a web-based service 3D character animation.

2.1.3 Design

In this stage, ideas will be arranged to produce game designs and storyboards, so that it becomes a reference in the next stage, namely the developing stage. The design used is the top-down design with the groove arranged from top to bottom as follows:

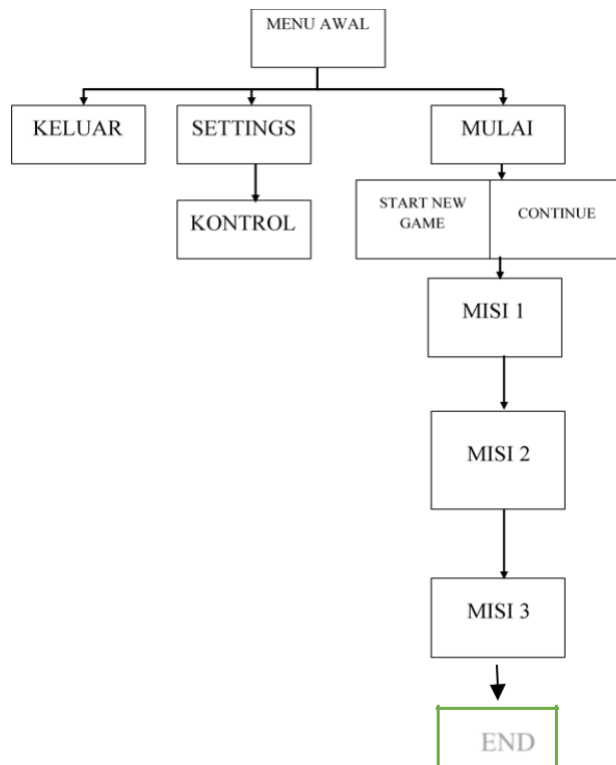
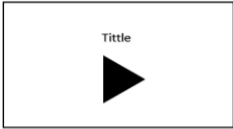
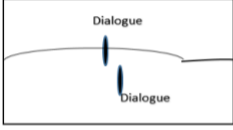

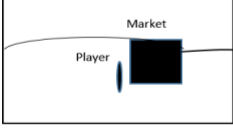



Figure 1. Top-down design

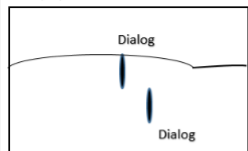
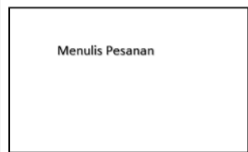
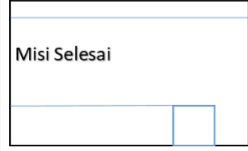
On the start menu, there will be an exit button to exit the game, a settings button to see the controls used in the game than a start button to start the game. This game itself has gameplay that is described in the following storyboard:

Table 2. Storyboard

Mission 1 and Mission 2

No		
1.		Description : Start menu Button : Play button
2.		Description : Accept the quest Asset : Player , NPC , Environment Dialogue : contains quest that must be carried out (in aksara jawa)
3.		Description : Run the quest (player search the material based on the quest) Asset : Player , Environment , Market Animation : Walk animation
4.		Description : Complete the quest (player buy the material) Keyboard : - F : buy Asset : Player , Environment , Market Animation : Walk animation
5.		Description : Quest done

Mission 3

No		
1.		Description : Accept the quest Asset : Player , NPC , Environment Dialogue : contains quest orders that must be done, namely writing gethuk buyer's orders (in aksara jawa)
2.		Description : Run the quest (player write the buyers order) Asset : Player , NPC , Aksara Jawa, Environment
5.		Description : Quest done

2.1.4 Develop

This stage refers to the previous stages which are then realized into game form. It takes several experiments to ensure that designs that have been made before can be realized. Because in making a game it is not certain that it will be realized by the overall idea and design. Then all assets that have been planned in the design stage are made, for the characters, character animations, and the environment, using 3D software. Then coding using C # script to realize.

2.1.5 Testing

Testing is done after the game is made in full to find out whether the game is running well or there are bugs. Then it will produce a decision to continue to the next stage if the game is running well and there are no bugs, meaning that input has a match with the desired output, which is suitable. Otherwise, it will be decided to return to the stage of development to fix the game from bugs. In this study, researchers used blackbox testing by checking each input and the overall action on possible bugs and output mismatches. The test is also carried out with user acceptance testing, the researcher asks for help from the user to try to play the game then will be given a questionnaire in the form of a google form. The questions on the questionnaire are to find out whether the game is running properly, the player feels comfortable with the gameplay, the attractiveness of the graphics and the player can know or remember *aksara jawa*. The questionnaire draft can be seen in the Table 2.

Table 3. The quetionnaire draft.

Question 1	Buttons on the menu, such as the start button, controls and others can function properly
Question 2	The characters in the game can move, such as walking and running
Question 3	The button on the pause menu works fine
Question 4	The game is going well
Question 5	The graphics in this game are interesting
Question 6	After playing this game, you start getting to know <i>Aksara Jawa</i> (didn't know <i>Aksara Jawa</i> before) or remembering <i>Aksara Jawa</i> (Already knowing <i>Aksara Jawa</i> before)

2.1.6 Filter

In the stage of the game filter will be reviewed based on all stages that have been carried out whether the game is appropriate in terms of gameplay, content, graphics and others. So it is feasible for the next stage.

2.1.7 Release

This stage is the last stage that indicates that the game is ready to be released to the public. But it is still possible that there are adjustments that require updating based on deficiencies

and responses from users. To find out the feedback and response from the user, a questionnaire is given.

3. RESULT AND DISCUSSION

3.1 Start Menu

In the start menu there is a *mulai* button to start the game, then a control button to display control information that must be used, then the *keluar* button to exit the game, as shown in Figure 3.



Figure 2. Start menu

3.2 Mission 1 Gameplay

The player will play the character as a gethuk trader along with the father of the character, the player will accept a mission to help his father in selling gethuk. Bakul Gethuk game has a background of Java which is still thick with Javanese culture like *aksara jawa*. The first mission player was given the task by his father to buy raw materials for making gethuk, then the player would buy these raw materials by searching in traditional markets by the mission given by looking at the market names written in *aksara jawa*. When the mission is successfully completed, a green panel will appear then the player can continue to the next mission. If the player fails to complete the mission because he bought the wrong material, a red panel will appear, the player must repeat the mission. Mission 1 can be seen in Figure 4.

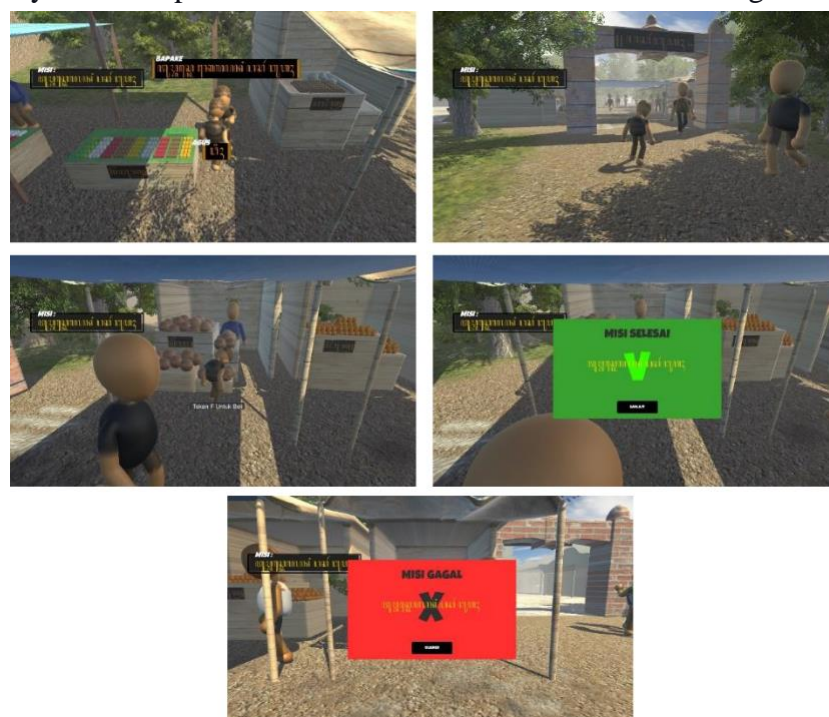


Figure 3. Mission 1

3.3 Pause Menu

In the pause menu there is a aksara jawa panel, pasangan and sandhangan that will help the player. There is also a resume button to return to the game and quit to quit the game. Pause menu can be seen in Figure 5.

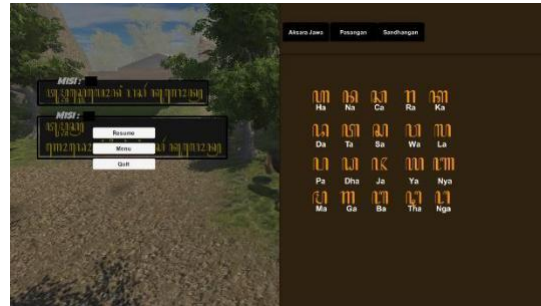


Figure 4. Pause Menu

3.4 Mission 2 Gameplay

Like in the first mission but in this second mission there will be two missions, if the first mission is complete a green check will appear and if it fails then a red panel will appear then the mission must be repeated, if both missions are completed an order will appear to proceed to the next mission, as shown in Figure 6.

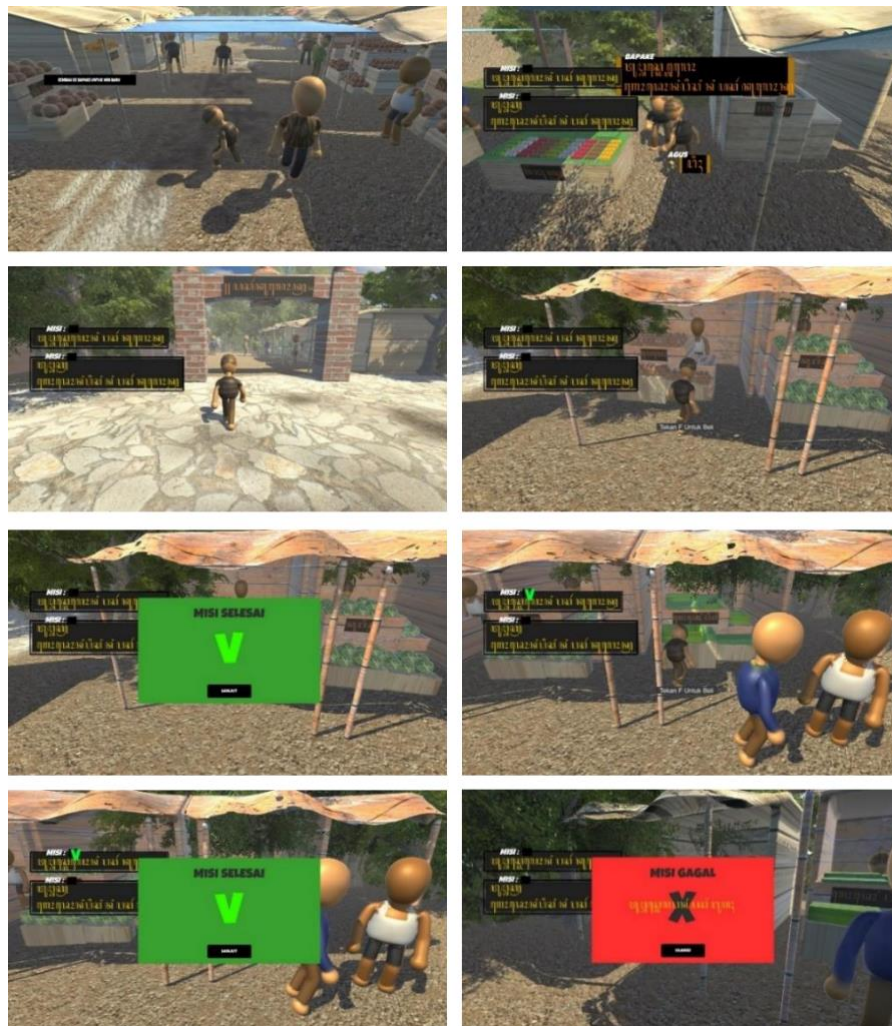


Figure 5. Mission 2

3.5 Mission 3 Gameplay

On the third mission the player will write a customer order. Player uses the mouse by left clicking while holding and writes according to the order.



Figure 6. Mission 3

3.6 Balckbox Testing

Testing uses the black box testing method to run whether the program can run properly by its functions such as button functions, game display, character movement, carrying out missions, to complete the mission.

Table 4. Blackbox testing

Input	Output	Suitability of function
Start Menu : Start Button	Start the game	Suitable
Control Button	Showing control	Suitable
Exit Button	Exit the game	Suitable
Gameplay : Walk	Switch places	Suitable
Rotate	Switch places	Suitable
Carry out the mission	Accept the mission, complete the mission, repeat the mission, continue the next mission	Suitable
NPC Movement	NPC moves	Suitable
PauseMenu : Resume Button	Back to the game	Suitable
Menu Button	Back to the start menu	Suitable
Quit Button	Exit the game	Suitable
<i>Aksara Jawa</i> Button	Display the <i>aksara jawa</i> panel	Suitable
<i>Pasangan</i> Button	Display the <i>pasangan</i> panel	Suitable
<i>Sandhangan</i> Button	Display the <i>sandhangan</i> panel	Suitable

3.7 User Acceptance Testing

Testing the user to find out whether it is acceptable and in accordance with the purpose of manufacture and to see the feedback. The test involved 15 users with details 13.3% of elementary

/ 20% middle /6.7% high school students, 46.7% of college students and 13.3% of workers from game forum on social media. The results of the questionnaire are calculated using Equation 1.

$$\text{Equation 1 : } \text{Percentage} = \frac{\sum \text{Score} \times 100\%}{S_{\text{max}}}$$

Highest score (S_{max}) = 5 x 15 = 75

$\sum \text{Score} = \sum (\text{SA}(\text{Strongly Agree})5 + \text{A}(\text{Agree})4 + \text{N}(\text{Neutral})3 + \text{D}(\text{Disagree})2 + \text{SD}(\text{Strongly Disagree})1)$

The calculation results are shown in Figure 7.

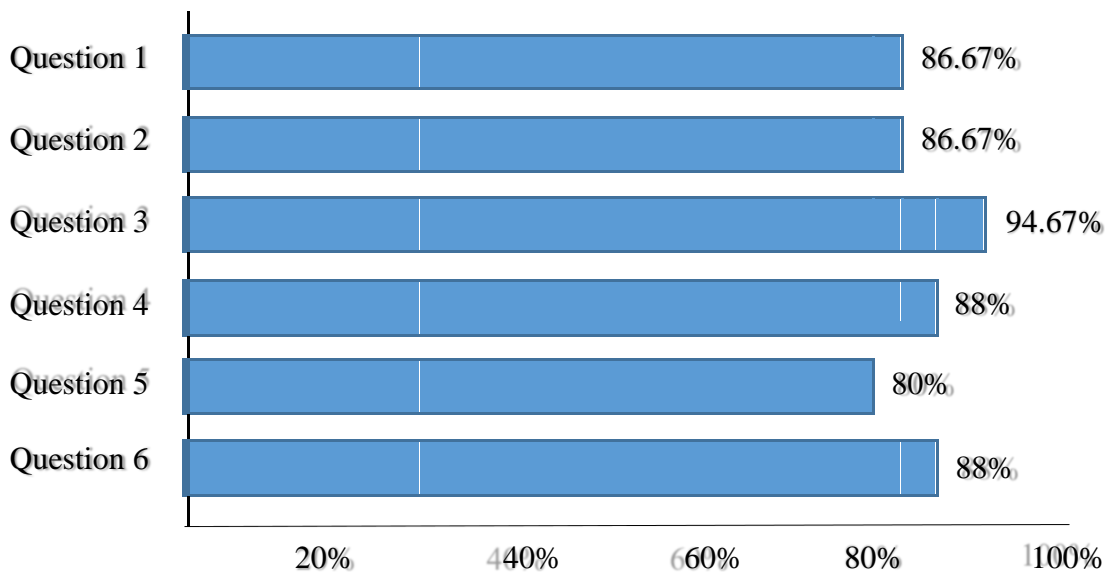


Figure 7. The percentage results of the questionnaire scores

Question 1, that is “Buttons on the menu, such as the start button, controls and others can function properly”, as many as 5 users answered SA(Strongly Agree) and 10 users answered A(Agree). After being calculated using equation 1, yields a score of 86.67%, indicates that the buttons on the menu run without problems and user can navigate seamlessly.

Question 2, that is “The characters in the game can move, such as walking and running”, as many as 7 users answered SA(Strongly Agree), 6 users answered A(Agree) and 2 users answered N(Neutral). After being calculated using equation 1, yields a score of 86.67%, indicates that users can comfortably run characters in the game.

Question 3, that is “The button on the pause menu works fine”, as many as 11 users answered SA(Strongly Agree) and 4 users answered A(Agree). After being calculated using equation 1, yields a score of 94.67%, indicates the pause menu works fine and make it easier for users to operate.

Question 4, that is “The game is going well”, as many as 9 users answered SA(Strongly Agree), 4 users answered A(Agree), 2 users answered N(Neutral) and 1 users answered D(Disagree). After being calculated using equation 1, yields a score of 88%, indicates that the game does not experience severe lag and bugs, which makes the user able to run the game smoothly and comfortably.

Question 5, that is “The graphics in this game are interesting” as many as 5 users answered SA(Strongly Agree), 6 users answered A(Agree), 3 users answered N(Neutral) and 1 users answered D(Disagree). After being calculated using equation 1, yields a score of 80%, indicates that the game is interesting and it is hoped that the user will be interested in the graphics of this game.

Question 6, that is “After playing this game, you start getting to know *Aksara Jawa*(didn't know *Aksara Jawa* before) or remembering *Aksara Jawa* (Already knowing *Aksara Jawa* before)”, as many as 7 users answered SA(Strongly Agree), 7 users answered A(Agree) and 1 users answered N(Neutral). After being calculated using equation 1, yields a score of 88%, indicates that many users are starting to recognize and recall *Aksara Jawa*.

4. CLOSING

All stages of development have been carried out starting from the idea until the game can be realized and tested for suitability of its function. From the Blackbox test that has been done, all the buttons and gameplay have matched the function between input and output. The game has also been tested on users, showing an overall of 87%, and many users are starting to recognize and recall *Aksara Jawa*, so that games can be used as a medium to preserve *Aksara Jawa*.

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